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Has Agricultural Trade Liberalization Improved Welfare in the Least-Developed Countries? Yes

Most of the gains from multilateral liberalization come from the countries' own liberalization efforts. Least-developed countries that failed to liberalize their trade policy lost the opportunity for gains that the Uruguay Round made possible.

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Summary findings

Ingco evaluates the progress in agricultural liberalization — and the welfare effects for least-developed and net food-importing countries — as a result of agricultural price shocks resulting from the Uruguay Round. She finds that:

- The changes in welfare are significantly affected by the structure of trade and distortions in the domestic economy.
- Although many economies are hurt by increases in world prices, losses in terms of trade are small relative to total GDP. Only in a few countries does the estimated welfare change constitute more than 1 percent of GDP.
- In several countries, the distortion effects are significantly larger than the terms-of-trade effects. In some cases, the distortion effects work in opposition to the terms-of-trade effects and are large enough to reverse the sign of the net welfare change.

In short, removing policy distortions could convert the small loss in terms of trade to potential gains. But many least-developed, net food-importing countries did not use the Round to support domestic efforts at trade reform. As most studies show, most gains from multilateral liberalization come from the countries' own liberalization efforts, so countries that failed to liberalize their trade policy lost the opportunity for gains.

This paper — a product of the International Trade Division, International Economics Department — is part of a larger effort in the department to evaluate the effects of trade liberalization with special focus on least-developed and net-food importing developing countries. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Jennifer Ngaine, room N5-060, telephone 202-473-7947, fax 202-522-1159, Internet address trade@worldbank.org. April 1997. (29 pages)

Has Agricultural Trade Liberalization Improved Welfare in the Least-Developed Countries?

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I. INTRODUCTION

The least-developed and net-food importing developing countries[1] continue to raise concerns that greater liberalization of trade in agriculture resulting from the implementation of the Uruguay Round Agreement (URA) will adversely affect them. The 1996 Singapore Ministerial Declaration reiterates the need for a plan of action and to monitor the Marrakesh Ministerial Decision on measures to counter any adverse effects of the reform program.

The effects of trade liberalization under the URA for developing countries have been expressed in various fora. While substantial real income gains for developing countries are predicted from the Agreement, potential welfare losses are estimated for some least-developed regions. For instance, studies by Harrison, Rutherford and Tarr (1995) and Goldin and van der Mensbrugghe (1995) show that the overall welfare effect of the URA on Sub-saharan Africa as a whole is estimated at a loss of between $1.2 and $1.8 billion (in 1992 dollars) or between 0.9 or 1.2 percent of GDP. The measured loss reflects a number of factors, including the rise in prices of major food imports, increases in the prices of imported textile and clothing products and the lack of own liberalization in the region. More than half of the estimated welfare loss were attributed to the adverse terms-of-trade effects.

The analysis in this paper complements previous studies by evaluating welfare changes at the country level in selected least-developed countries. The analysis focuses on the welfare effects of agricultural price changes taking into account the trade and domestic agricultural distortions in the economy. The diversity in country-by-country trade characteristics and structure of policy distortions indicate important variations in the nature of welfare changes at the country level. Given the world price change, the effects depend on the structure of distortions and on their trading position in the import-competing and exportable commodities affected by liberalization. The progress in agricultural trade liberalization resulting from the implementation of the agreement since the completion of the Round is discussed.

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[1] The least-developed countries include those recognized by the United Nations Economic and Social Council (countries with per capita income below US$1070) and developing countries which notified to the World Trade Organization their status as net-food importers. As of November, 1996, these includes Barbados, Cote d'Ivoire, Dominican Republic, Egypt, Honduras, Jamaica, Kenya, Mauritius, Morocco, Peru, Saint Lucia, Senegal, Sri Lanka, Trinidad and Tobago, Tunisia, and Venezuela.

Because of the relatively small predicted changes in agricultural prices, it is generally expected that the welfare effects will be small (relative to GDP). However, the analysis is still usable in providing further empirical evidence about the significance of domestic policy distortions in evaluating the nature of welfare effects of multilateral trade liberalization on individual countries. By analyzing the welfare changes at the country level, the analysis provides information about the country-by-country situation.

The welfare analysis follows the methods developed by Anderson and Neary (1992, 1994) and Anderson (1996). Following the Balance of Trade Function approach, welfare measures comprising of terms-of-trade effects and so-called "distortion effects" are estimated. According to the terms-of-trade effect assessment of welfare changes, each 1% increase in import price adds to the compensation required to maintain real income constant at a rate equal to the import share of base expenditure. For example, a 10% increase in the price of an import taking up 10% of national expenditure will cause a compensation requirement equal to 1% of national income. If this is not met, a welfare loss equal to 1% of real income is incurred.

However, the overall welfare effect is influenced by the nature of initial policy distortions. In many least-developed countries, governments tend to heavily tax producers and provide widespread food price subsidies to consumers. Food imports are usually sold at prices significantly below world prices. In contrast, producers in some countries who had been taxed in the 1970s and early 1980s now receive subsidies because producer prices have been set above world levels. Despite the structural adjustments and policy reforms during the 1980s, important distortions remain in these countries. Hence, the countries' trade patterns are due to these distortionary policies. In cases where food imports are heavily subsidized, Anderson (1996) showed that the result that net food importers lose from liberalization may be reversed. This is because an increase in food prices results in a reduction of an activity which is actually inefficiently large--viz. its marginal social cost is above the willingness-to-pay of consumers. The substitution effect creates an offset to the terms-of-trade effects, which can be large enough to reverse the direction of welfare impacts. In other words, if imports are explicitly or implicitly subsidized, an increase in world prices which causes imports to fall may reduce expenditures on import subsidies sufficiently to raise overall welfare.

Due to data limitations, the more comprehensive welfare measures (including distortion effects) are estimated for only 14 countries where data on trade and domestic distortions are available. However, the first-order welfare measures (terms-of-trade effects) are estimated for 54

countries. While only partial, the first-order welfare measures provide usable information about the terms-of-trade effects for a wide number of countries. Some qualitative information about the nature of distortions in several of these countries are used to infer about the distortion effects. Consistent with Anderson's (1996) findings, the results provide further evidence about the importance of distortion effects in the overall welfare change. In several countries, the distortion effects works in opposition to the terms-of-trade effects; and in a number of cases, sufficiently large to offset the terms-of-trade loss.

II. MEASURING WELFARE EFFECTS

To facilitate the interpretation of results, the approach in welfare measurement is briefly described in this section. The approach follows the most common framework using the Balance of Trade Function. The theoretical underpinnings of the Balance of Trade Function are discussed by Anderson and Neary (1992, 1994) and compared with other welfare measures by Martin, et.al. (1994, 1996). The brief discussion below is based on the analysis by Anderson (1996) and Martin (1996). Similar notations are used to aid the discussion. Given a vector of goods traded in world markets at external prices p^* and sold domestically at prices p, the Balance of Trade Function for a representative agent economy is defined as follows:

$$(1) \qquad B(p,p^*,u) \quad = \quad e(p,u) - (p-p^*)' z_p (p,u).$$

where B indicates the welfare measure with utility fixed exogenously at initial level u; e is the trade expenditure function and z_p is the trade vector, by Shephard's Lemma. A subscript denotes differentiation, except when index variables i, j are used. In other words, z_p is a vector of (compensated) net imports/exports, and the subscript p denotes the first derivative with respect to domestic prices. The term $(p-p^*)$ is interpreted as the tariffs or tariff equivalent of the prevailing trade distortions in the economy. The trade vector has positive elements for imports and negative elements for exports. Given p^* and a fixed policy $(p-p^*)$, the equilibrium level of utility, u, is determined by the balanced trade requirement specified by setting $B(\ )$ equal to zero. The welfare effects of changes in external prices of traded goods p^* is derived by estimating the change in the foreign exchange required to maintain the same level of utility u with the new price p^*. Assuming no change in the policy vector $(p-p^*)$, the change in p^* passes fully through to p, the welfare change is estimated as follows:

(2) $B'_{p^*} = z_p' - (p-p^*)'z_p.$

The ith element of the row vector B'_{p^*} is specified as:

(3) $B_i = z_i - (p-p^*)'\_z_i/\_p.$

Based on equation (3), a local approximation to the welfare change of a set of price changes as a proportion of GDP (y) is derived by Anderson (1996) using a Taylor series expansion as follows:

$$\sum_i \frac{1}{y} B_i \hat{p}_i = \sum_i \frac{z_i p_i}{y} \hat{p}_i + \sum_{i,j} (p_j - p_j^*) \frac{z_j}{y} \frac{p_i \partial z_j}{z_j \partial p_i} \hat{p}_i$$

(4)

$$= \sum_i \frac{z_i p_i}{y} \hat{p}_i + \sum_{i,j} \tau_j \frac{p_j z_j}{y} \{\varepsilon_{ij}\} \hat{p}_i$$

where τ_j denotes the *ad-valorem* tax on good j, $(p_j - p^*_j)/p_j$ and ε_{ij} denotes the elasticity of import demand j with respect to price i. The equation says that the percentage change in real income due to the external price changes is equal to the *terms of trade effect*, the first term, plus *the distortion effect*, the second term. The terms of trade effect is equal to the sum of the trade shares times the percentage changes in external prices. The second term is the standard dead weight loss term and are estimated given the additional information on general equilibrium elasticities and on the structure of distortions in the economy.

To further aid understanding, a graphical measure of the welfare effects represented in equation (4) are derived. Given an increase in world prices from p_0^* to p_1^* the graphical measures are derived in Martin (1996) using a second-order Taylor series approximation of the Balance of Trade Function as follows:

(5) $B_1 - B_0 = [z_p - (p - p^*) z_{pp}] (p_1^* - p_0^*) + 1/2 (p_1^* - p_0^*) z_{pp} (p_1^* - p_0^*)],$

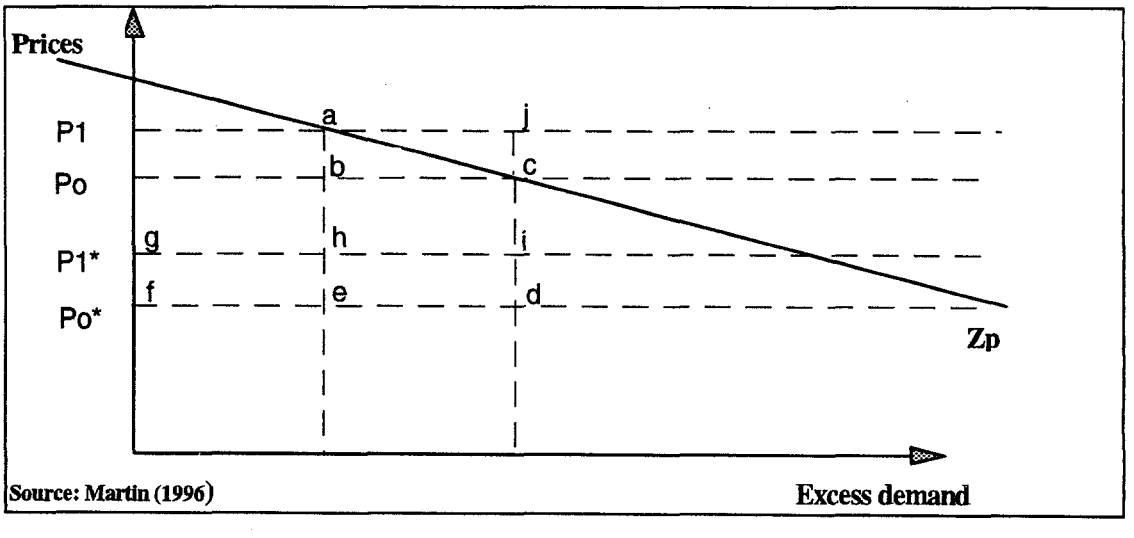
$= [z_p (p_1^* - p_0^*)] - [(p - p^*) z_{pp} (p_1^* - p_0^*)] + [1/2 (p_1^* - p_0^*) z_{pp} (p_1^* - p_0^*)]$

where each subscript p denotes the derivative of the relevant function with respect to a particular price; z_{pp} refers to the derivative of the compensated excess demand function at the initial utility level. If the initial tariff level were zero, the equation will consist of two terms. First, the term $[z_p (p_0^* - p_1^*)]$ measures the terms of trade loss resulting from an increase in world prices of

imports or a fall in the world price of exports. The second, quadratic term measures the extent to which the terms-of-trade losses are reduced by the substitution of domestically produced goods for more expensive imported goods, or the diversion of goods previously exported to domestic markets. In this first-best case, the formula indicates that the welfare effects of the changes in world prices will depend on the sign of the first-order term, z_p. That is, whether the goods whose price changes are imports or exports. In cases of non-zero initial tariffs, the second term indicating the loss in tariff revenue resulting from reduced import must also be considered.

Equation (5) is illustrated graphically in Figure 1. The welfare effects are identified to include the areas *abc, bcde* and *gidf*. The area *abc* represents the welfare triangle associated with replacement of imported commodities with now cheaper domestically produced goods, and correspond to the quadratic term in equation (2). The area *ajih* (=bcde) represents the loss of tariff revenues resulting from reduced import volumes (the term $(p - p^*)\, z_{pp}\, (p_1^* - p_0^*)$) in equation (2). As pointed out by Anderson (1996) and Martin (1996), this component is important for distorted economies. The area *gidf* is the income loss resulting from the terms of trade decline brought about by the rise in world prices, defined by $z_p\, (p_1^* - p_0^*)$. The areas *ajih* and *gidf* both reflect welfare losses, while the area abc reflects an efficiency gain.

Figure 1. Welfare Effects of an Increase in World Prices



III. RESULTS

A. PROGRESS IN AGRICULTURAL TRADE LIBERALIZATION[2]

The Uruguay Round achieved a great deal by bringing agriculture under GATT disciplines. New rules were developed to control import barriers, export subsidies, and the total level of support to agriculture. However, the implementation of individual country commitments, while maintaining consistency with the new rules appears to be managing trade more than liberalizing trade. Based on the estimates of pre- and post-URA trade distortions and the implementation of market access commitments in 1995-96, the progress in trade liberalization remains limited and uneven across countries. Restrictions on market access remain substantial and domestic markets in many developing countries continue to be largely isolated from world price movements. Since the completion of the Round in 1993, only a small part of the agreed liberalization has taken place.The following section briefly reviews the new rules, their implementation and the progress in post-URA agricultural trade liberalization.

Tariffication and Minimum Access. The most significant aspect of the UR agreement on agriculture was a change in the rules regarding market access. The agreement mandates, except in cases of "special treatment,"[3] to (i) replace non-tariff barriers with tariffs; (ii) bind all tariffs and tariff equivalents[4] ; (iii) reduce tariffs by 36 percent[5] over six years in industrial countries, and by 24 percent over ten years in developing countries; and (iv) to establish minimum access commitments at 3 percent of 1986-88 consumption, rising to 5 percent (2 to 4 percent for developing countries) at the end of implementation period.

Export Subsidies. Participating countries accepted binding commitments on maximum export subsidization (Article 3), leading to an agreed reduction in expenditures on export subsidies (industrial countries by 36 percent and developing countries by 24 percent) and reduction in the

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[2] The evaluation of agricultural reforms agreed in the Uruguay Round and the extent of agricultural trade liberalization actually achieved are examined in detail in Ingco (1995), Hathaway and Ingco (1995), and IATRC (1994).

[3]Special treatment was allowed on commodities which met the following conditions: (i) commodities that are major staples in the diet, (ii) imports are less than 3 percent of domestic consumption in the base period, and (iii) no export subsidies have been provided. In return, minimum access levels were required to be introduced at 4 percent of domestic consumption rising to 8 percent over the implementation period of the Round. The principal cases of special treatment were rice imports in Japan, the Republic of Korea, and the Philippines.

[4]The commitment to the maximum tariff that can be applied at the border. This means that countries can apply tariffs at or below the bound maximum, but commit themselves not to raise tariffs above that, without renegotiating in GATT and compensation given to affected trading partners.

[5] Based on simple, unweighted averge.

quantity of subsidized exports (industrial countries by 21 percent and developing countries by 14 percent) over the implementation period.[6] The new rules on export subsidies under the Round, while important, were not as sweeping as those in market access, in that the Round did not outlaw export subsidies but only imposed limits on their application.

Domestic Support. New limits were established on the aggregate level of trade-distorting domestic agricultural support. Based on fixed external prices in the base period (1986-88), the agreement specifies the determination of the Aggregate Measure of Support (AMS) and requires developed countries to reduce their total AMS by 20 percent (13.33 percent in developing countries) over the implementation period. Individual commodity support is not limited except that if support exceeds the 1992 level. For several reasons, these concessions on domestic support reductions are considerably less effective than those of border measures.[7] First, the constraint on aggregate, rather than commodity specific support, leaves much scope for continued support policies and domestic policy action on particular commodities. Second, the "green box"[8] will allow many policies to continue unreduced in participating countries. Last, the AMS calculations are based on the outlays during 1986-88, which was a period of relatively low world prices for agricultural products and generally high expenditures on domestic support to farmers.

B. ESTIMATES OF PRE- AND POST-URA IMPORT RESTRICTIONS

Previous studies (Ingco, 1995; Hathaway and Ingco, 1996) have examined the ways in which individual countries took liberties with the generalized rules of the GATT agreement in tabling their tariff commitments. Ingco (1995) found that countries took liberties in converting former quantitative restrictions to tariff equivalents, with the result that non-tariff restrictions were replaced by very high over-quota tariffs, which in many cases has effectively limit trade in 1995 to the minimum access quota levels and in some cases, allow the country to insulate domestic prices from world prices. Most developing countries took an option that allowed them to bypass tariffication of non-tariff barriers and merely declared bound tariffs for products where non-tariff barriers had been used. While several developing countries in Latin America and East-Asia

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[6]Six years for industrial countries and ten years for developing countries.

[7] See Ingco (1995) and Hathaway and Ingco (1996) for detailed discussion.

[8]This includes general services involving expenditures which provide services and do not involve direct payments such as research, pest and disease control, training, extension, marketing and promotion, and infrastructure services. These measures shall not involve price support to farmers. In developing countries, government measures to promote agricultural and rural development such as investment subsidies, input subsidies provided to low income farmers (cash or kind) are exempted.

committed to bind tariffs at relatively low levels (less than 30 percent), many countries in Africa and South Asia declared very high (over 100-200 percent) bound tariffs for agricultural products. Overall, the choice of the base period (1986-88), combined with excessive or "dirty" tariffication, and the use of very high "ceiling" bindings in developing countries contributed to the limited progress in actual liberalization achieved.

Figure 2 summarizes the average tariff equivalents of non-tariff measures in agriculture (applied rates in 1979-93) and the average bound tariff rates agreed in the Uruguay Round in selected countries. As shown in Figure 1, many of the post-UR tariffs in agriculture resulting from the tariffication process are very high and, while they will be reduced during the implementation period, will remain very high in many countries. Developing countries were allowed to convert unbound tariffs into "ceiling bindings" unrelated to previous rates of protection. Many countries availed of this option and chose to use rates well above those that previously applied. The pattern of tariff commitments for developed and developing countries are broadly similar, in that the tariff bindings resulting from the Round are often higher than the average rates of protection applied prior to the completion of the Round. The very high tariff bindings and the continuation of state-trading enterprises with the power to charge "mark-ups" in combination with tariff quotas, or with monopoly control of imports and exports, would limit the extent of liberalization achieved from the Agreement. If countries chose to use their option to set high tariffs, the costs to these countries could be large.

C. ESTIMATES OF AGRICULTURAL PRICE CHANGES

Numerous studies were carried out during the course of the negotiations on the potential impact of agricultural liberalization on world prices and trade. To motivate and guide policy reform, analysts evaluated the impacts of complete and several stylization of partial liberalization based on assumed percentage reductions in applied protection.[9] However, as the details of implementation of final commitments of GATT member countries became known, it became evident that previous stylization of liberalization have been optimistic compared to the actual extent of liberalization achieved.

The most recent estimates of price impacts of the Uruguay Round agreement are shown in Table 2. The results reflect the complete impact of the UR agreement after the reforms have

[9]Excellent summaries are found in Valdés (1987); Goldin, Knudsen, and van der Mensbrugghe (1993) and Brandão and Martin (1993).

been completely phased-in, and therefore incorporates the long-run supply and demand adjustments that will result from the liberalization process. The predicted changes in world prices are relative to the numeraire, which is the price of OECD manufacturing exports. Given the long-run nature of the policy reforms, the studies focused on the impact on the long-run average level of prices, rather than on short-run year-to-year price changes. The changes are specified as percent deviations from the benchmark levels at the close of implementation period.

Brandão and Martin (1993) and Goldin, Knudsen, and van der Mensbrugge (1993) both utilized the Rural-Urban North-South (RUNS) model developed by the OECD and the World Bank, with different stylization of partial liberalization in agriculture. The results in column 1 by Brandão and Martin (1993) assumed trade liberalization along the lines of the Dunkel (GATT, 1991) proposal, where only positive protection was reduced by 36 percent for import protection and by 20 percent for domestic support. The results in column 2 by Goldin, Knudsen and van der Mensbrugghe (1993) refer to an experiment in which all agricultural protection (positive or negative, domestic or border) was reduced by 30 percent for all commodities in all regions (including regions which are not currently members of the GATT/WTO. [10] The price changes estimated by Brandão and Martin (1993) are broadly similar to the estimates by Goldin, *et al* (1993), except for several commodities (rice, coffee, and dairy products) where the absence of discipline in negative protection in the Dunkel package scenario resulted in larger price increases. In both studies, dairy, sugar, beef and wheat are the commodities for which the largest price increases are observed, reflecting the high levels of protection in the OECD countries.

The most recent World Bank analyses of the Uruguay Round (Goldin and van der Mensbrugghe, 1995; Harrison, Rutherford and Tarr, 1995; Hertel, Martin, Yanagishima and Dimaranan, 1995) utilized the detailed evaluation of final commitments in agriculture carried out by Ingco (1995). Goldin and van der Mensbrugghe (1995) also consider non-agricultural liberalization in the new simulations; thus, including the considerable liberalization of manufacturing protection which raises world import demand and the average price of OECD price of manufacture exports, the deflator of agricultural prices used in the RUNS model. These

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[10]If a country protections its agriculture, this involves a 30 percent reduction in import tariffs or a 30 percent reduction in export subsidies. If a country is taxing agriculture, Goldin, et al. assumed a 30 percent reduction in its import subsidy or a 30 percent reduction in its export tax. The reduction in the tariff equivalent is assumed to occur entirely in the year 1993, and the new rate is held constant for the rest of the simulation period at the lower level. All agricultural input subsidies are reduced by 30 percent.

factors combined result in smaller estimated price impacts due to the Round than those obtained in earlier studies.

Because of the inherent difficulty in identifying the true counterfactual rate of protection in the absence of the Round, analyses based on alternative assumptions are presented. In the simulations by Goldin and van der Mensbrugghe (1995)[11], the extent of liberalization was estimated by comparing the final tariff binding at the end of the Round's implementation process with a benchmark rate of assistance based on average applied rates of protection prevailing before the conclusion of the Round. Liberalization is estimated to occur only if the final rate is below the previously applied rate. The results in column 3 (scenario I) are based on a reference scenario which assumes as a benchmark level of protection (through 2002) the long run average level of protection (1979-93). The latter, as a measure of the true counterfactual, is appropriate if the expected rate of protection in the absence of the Round is considered to be constant. The long run average smoothes out the high variability in measured rates of protection (mainly due to volatile world prices). However, this scenario does not consider the recent structural change resulting from unilateral liberalization in developing countries. Given the uncertainty in the counterfactual, the empirical results are only indicative of the effects of reforms from historically observed levels of protection, rather from the unknown rates of protection that would have prevailed in the absence of the Round.

The results in column 4 (scenario II) considers the trends and structural change in recent years by assuming as a counterfactual the average protection in a more recent period (1989/90-1993). In general, wheat, dairy, sugar, and meat products are the commodities for which the largest price increases are observed, reflecting the high levels of protection in these commodities in the OECD countries. The greater liberalization in OECD countries in Scenario II lead to sharper supply response than in Scenario I, resulting in the higher price changes for these commodities. Based on Scenario II of RUNS (1995), the actual results of the final UR commitments might increase prices in 2002 by 3.8% in wheat, 2.3% in coarse grains, and 1.8% in sugar. At the same time, world prices of some major imports such as other foods (-1.4%), rice (-0.9%), coffee (-1.5%), tea (-1.4%), and cotton (-1.2%) are predicted to decline. These percentage changes in

[11]The quantitative evaluation of the Uruguay Round by Goldin and van der Mensbrugghe (1995) incorporates the impact of tariffication and export subsidy commitments in agriculture and in an aggregate way, manufacturing. Their analysis does not include the results of the Uruguay Round in the areas of trade in services, investment, and intellectual property.

prices are significantly smaller than earlier estimates based on different stylization of complete or partial liberalization

The results in scenarios I and II are based on the assumption that restraints on domestic support will be ineffective. In contrast, scenario IV (column 5) assumes that domestic support restraints will be effective. The benchmark simulation used 1989/93 protection levels for the period 1994/2002. Where protection is negative (in the case of import subsidies or export tax), no changes in protection rates were assumed. As expected, the price impacts from scenario IV show larger prices increases than in Scenario I and II.

The last column are from the FAO study (1995) based on a partial equilibrium model and excludes the impact of manufacturing liberalization. The analysis is based on the detailed data on agreed bound tariffs rather on stylized reductions used in other studies. However, the FAO study does not consider the extent of "slippage" due to the excessive tariffication and ineffective disciplines in domestic support. That is, the FAO study measures liberalization by the reduction in the bound tariff rate.

Overall, the price changes from several simulations shown in Table 2 suggest that world agricultural prices relative to the price of OECD manufacturing exports are unlikely to rise significantly as a result of the actual outcome of the Round. The estimates are significantly smaller compared with the price boom in food prices in 1995 following the completion of the Round. In utilizing these results, it is important to keep in mind the inherent difficulty in defining the true counterfactual rate of protection. Since protection rates are measured based on world prices, there is a question of establishing the representative world market prices at the end of the implementation period. Further, as shown by Anderson and Hayami (1986), protection rates in agriculture are determined by economic variables and influenced by the level of development of a country. If the empirical evidence of the upward trend in protection in some countries (e.g. East Asia and EU) are true and assumed to continue in the future, then the counterfactual rate of protection in the absence of the Round would be higher than those assumed in the analyses, and the price impacts would be larger. On the other hand, it can be argued that the recent fundamental reforms in many countries, partly motivated by factors independent of the Round, (e.g. CAP reforms in EU, liberalization in certain commodities in Japan and the Republic of Korea, and unilateral reforms during structural adjustments in developing countries) represent a structural change toward more world market integration and open economies. Since many of these reform began in early 1990s, the benchmark protection based on 1989-93 have captured these changes to

a certain degree. Based on this benchmark, the estimated reductions in protection resulting from the UR would have been smaller and the impacts on world prices correspondingly lower.

D. TRADE DATA

The welfare effects will partially depend upon the trading position in the commodities affected by liberalization. In general, net-food importers would be expected to benefit from reforms which lower the prices of their food imports, and suffer from price increases.[12] In aggregate, total food imports accounted for about 8% of LDC total merchandise imports over the 1990-93 period. Cereals accounted for approximately 3%. However, in some countries (e.g. Bangladesh, Egypt, Mozambique), total food comprised of 20-25% of total merchandise imports during the same period.

The data on net trade positions (imports-exports) in value terms are derived from FAO's commodity balance database (CBD).[13] The net trade values used in the RUNS model are also based on this database; hence, consistent commodity coverage are ensured. For each primary and processed commodities, the commodity balance database contains a comprehensive picture of the pattern of a country's commodity supply and utilization. The total quantity produced in a country added to the total quantity imported and adjusted to any change in stocks gives the supply available. On utilization, a distinction is made between the quantities exported, fed to livestock, used for seed, used for manufacturing and other uses, or lost during storage and transportation, and food supplies available for human consumption. The FAO data on imports covers all movements into the country of the commodity in question. In includes commercial trade, food aid granted on specific terms, and estimates of unrecorded trade.[14] Exports covers all movements out of the country of the commodity in question. FAO also reports whenever possible trade in processed commodities expressed in the originating primary commodity equivalent. For example, wheat are imported as bulk grain and/or as processed (e.g. wheat flour, wheat bran, wheat germ, wheat gluten, etc). The value of imports and exports of these processed products in terms of the

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12. However, as indicated by Tyers and Falvey (1989), this need not always be true in the case where significant and multiple distortions exist in the food sub-sectors.

13 The FAO data are based on official country trade statistics on standard trade classification (SITC). Trade data are included in both the Commodity Balance Databases (CBD) and the Supply and Utilization Database or Food Balance Sheets (SUA). The difference in the databases mainly concerns the processed products that are expressed in primary commodity equivalent in CBD whereas in SUA, trade accounts are shown by product weight, often in different detailed categories. However, the differences are relatively small and the grouping "total food" in CBD are very similar to those used in the supply and utilization accounts.

14The import data are reported in terms of net weight, i.e. excluding the weight of the container.

originating primary commodity equivalent (i.e. wheat equivalent) are added to derive the total wheat and wheat products imports in wheat equivalent. The actual value (in US$) of net trade is the difference between imports on a c.i.f. basis and exports on a f.o.b. basis.

The data on value of imports and exports are aggregated to match the 15 agricultural commodity categories in the RUNS model. Given the ambiguity in the UR Decision as to what constitutes "total food", a number of definitions are considered. To obtain net expenditures, "total food" is defined following FAOs concept of "basic foodstuffs" which includes all potentially edible commodities, excluding fish. This is the most comparable to the commodity categories used in the RUNS model; total food includes all grains, meats, coffee, cocoa, tea, vegetable oils, dairy products, and other foods. For comparison, a second definition of "food" include only the major food items (grains, pulses, livestock products, fruits and vegetables), excluding tropical beverages (coffee, cocoa, tea), spices, sugar, fish, oilseeds and oils. A third definition of "food" comprise only of cereal grains. Cereals have traditionally been used as the indicator of food deficits because it accounts for nearly 60 percent of total calories consumed in developing countries. According to FAO (1995), it is the most operational of all the definitions due to availability of up-to-date information on this group of commodities.

The values of net trade expenditures for total food in nearly all developing countries are presented in Table 3. The data indicates that among 125 developing countries, 74 were net importers and 51 were net exporters of total food (including all edible commodities). When only major food items (cereals, pulses, livestock products, fruits and vegetables) are considered, the number of net importers increases to 88 countries. If "cereals" are used as the indicator, most developing countries (109 out of 125) are classified as net food importers.

E. TRADE AND DOMESTIC DISTORTIONS IN LEAST-DEVELOPED COUNTRIES

As shown in Martin and Winters (1995), the welfare impacts of multilateral liberalization depend heavily on whether a country participates in the liberalization process and hence reaps efficiency gains. The studies in Martin and Winters (1995) showed that the regions with the larger reductions in import prices are generally predicted to achieve larger welfare gains.

In this section, we look at the tariff commitments of selected individual least-developed countries. The data on applied tariffs and tariff ceiling bindings for agricultural products committed in the URA are shown in Table 4a and 4b. Table 4a summarizes the estimated pre-URA applied rates of protection over 1982-92 with the average tariff bindings given in countries in

sub-Saharan Africa (excluding Nigeria). Table 4b shows the level of tariff ceiling bindings and other duties and charges for all agricultural products. As indicated by the tariff commitments, many least-developed net-food importing countries were extremely cautious in their own liberalization commitments under the Round. Except Nigeria, which committed to reduce its rate of protection on wheat and coarse grains to 150 percent (from 190 and 452 percent in the 1982-92 period), very few commitments to reduce applied protection were offered. The data also indicate that these countries left themselves significant room to raise applied protection, given the very high levels of tariff bindings.

At the same time, the UR agreement is unlikely to burden least-developed and net-food importing countries with many new obligations. This is because many of these countries made no substantial liberalization commitments on border protection either in other sectors such as industry or services. Moreover, many of the general exemptions for development and balance-of-payments support remain available for them to legitimize trade restrictions.

The tariff data are derived from the TRAINS, WTO IDB database and from the details of the PSE and CSE database developed by the USDA. Where PSE and CSE data are not available for some commodities, they are set equal to zero.

F. ESTIMATES OF WELFARE IMPACTS

The welfare effects of world price changes resulting from the URA for 14 countries based on the comprehensive measures (terms-of-trade and distortion effects) are shown in Table 5. In addition, the first-order terms-of-trade impacts estimated for the 54 least-developed countries are shown in Table 6. Estimates based on the baseline price changes (scenario II) and those based on the largest predicted price changes (scenario IV of Goldin et al) are presented.[15] All estimates represent percent changes at the end of the implementation period.

The results are summarized as follows. First, as expected, the small world price changes applied to a small proportion of total expenditures result in relatively small (in proportion to total GDP) changes in welfare in many of the least-developed countries studied. Only in a few countries are the estimated welfare change constitute nearly one or over one percent of GDP. Among the countries considered, the largest welfare change as a result of agricultural price shocks appears to

[15] Detailed estimates for all agricultural products are available upon request.

occur in Egypt, where the welfare effects in both scenarios are estimated to be above 3 percent of national income.

Since the baseline price changes (scenario II) are less than 10 percent for all agricultural commodities, the first-order terms-of-trade effects in the baseline case are relatively negligible in many countries. There are some unexpected results, however, under the alternative scenario where even the partial, first-order terms-of-trade effects represent more than half a percent of real income. This reflects the large price changes (over 10 percent) in major import commodities such as wheat, sugar and dairy products. The results for Egypt, Gambia, Guyana, Honduras, Mauritania, Mozambique, Nigeria, Pakistan and Somalia stand out in this way. Hence, if based on the largest predicted price changes (scenario IV), the terms-of-trade effects are shown to increase quite significantly in these countries, compared with the baseline case.

Second, the distortion effects appears to be much larger than the terms-of-trade effects in several countries. In some countries, the distortion effects works in opposition or have the opposite sign as the terms-of-trade effects. In these cases, the distortion effects offset the terms-of-trade impacts by enough to reverse the sign of the welfare changes. This is most significant in the case of Bangladesh and India. In contrast, the distortion effects operates in addition or have the same sign as the terms-of-trade effects in several countries, thus reinforcing the terms-of-trade changes. In several countries, the distortion effect is large enough to push the total welfare effect to almost 1 percent or more of total GDP. This is true in the case of Egypt, Kenya, Pakistan, Tanzania and Zambia.

Third, the trade distortions measured in terms of tariffs and/or tariff equivalents, are important component of the distortion effects in many of the countries considered. The results indicate that the larger the initial trade distortions, the larger is the overal welfare change. This is true in several countries, particularly Egypt and India. In a number of cases, the impacts tends to result in welfare losses, partly explained by the loss in tariff revenues resulting from reduced imports. Also, the terms-of-trade changes tend to be welfare reducing in countries where there the initial trade distortions are present in many commodities.

Fourth, domestic distortions represented by the estimated producer and consumer subsidy equivalents (excluding tariffs and other border measures) are also important in the nature of welfare impacts. In countries where the producer and consumer subsidy equivalents are very large in important commodities, the large domestic distortions results in welfare losses. This occurred

in the case of Egypt, Pakistan, Tanzania, and Zambia, In a number of cases, the small terms-of-trade losses are reversed into small gains if all domestic distortions are eliminated.

Table 5. Terms-of-Trade and Welfare Changes in selected countries, Percent.

Country	Welfare Effects		Terms-of-Trade Changes	
	Scenario II [1/]	Scenario IV [2/]	Scenario II [1/]	Scenario IV [2/]
Bangladesh	0.104	0.414	-0.016	-0.05
India	-0.465	-0.546	0.008	0.03
Pakistan	-1.079	-1.089	-0.053	-0.06
Indonesia	-0.028	-0.039	-0.010	-0.01
Thailand	0.005	0.021	0.012	0.05
Egypt	3.050	3.791	-0.530	-0.65
Kenya	0.970	0.820	0.151	0.14
Morocco	-0.003	0.003	-0.027	0.03
Nigeria	-0.551	-0.621	-0.025	-0.09
Tanzania	1.840	1.320	-0.031	0.15
Turkey	-0.153	-0.110	0.021	0.05
Tunisia	0.031	0.051	0.054	0.065
Zambia	-1.070	-2.280	-0.032	-0.02
Zimbabwe	0.551	0.581	0.065	0.47

1/ Using price changes in scenario II by Goldin, et. al (1995)
2/ Using price chnages in scenario IV by Goldin, et. al (1995)
Source: Author's results.

The results for Egypt provide interesting insights. Egypt has large domestic distortions and has a significant share of GDP based in agriculture. The level of support or taxation vary significantly by commodity. The largest taxation occurs in cotton, rice and sugar. Taxes to producers exceeded 500 percent of producers revenue in the early 1980s, but has fallen markedly to about 170 percent by 1989. Aggregate producer subsidy equivalent for five important commodities (wheat, maize, rice, sugar and cotton), comprising 80 percent of cultivated area was about 175 percent in 1989, indicating large average taxation. Egypt is a large net importer of wheat, coarse grains, sugar, meats, and other foods; and a net exporter of cotton. Combined with the predicted world price declines in rice, cotton and other foods, the impact is to reduce further an activity which is already below its efficient level (i.e. marginal benefit is above marginal cost). In addition, rice had a large positive consumer subsidy equivalent, with the effect of increasing an activity which is already above its efficient level. These distortion effects tend to dominate the other effects which have opposite signs.

In cases where the distortion effects dominate the welfare loss, the removal of domestic distortions in a number of countries tend to convert the small terms-of-trade losses to welfare gains

due to the trade distortion effects, such as in the case of Bangladesh. The terms-of-trade effects in several countries appears sensitive to the structure and magnitude of price changes. For example, the terms-of-trade losses are converted to a small terms-of-trade gain in a few cases when the larger price changes based in scenario IV are assumed.

The price increases in wheat and vegetable oils, together with increased prices for coarse grains and sugar result in adverse terms-of-trade changes particularly in least-developed countries in Africa and South Asia. This is because many least-developed countries in Africa are net-food importers particularly in wheat, rice, and dairy products but exporters of tropical beverages (coffee and cocoa), some oilseeds, and some tropical fruits and agricultural raw materials (cotton). The predicted price increases in grains and livestock products combined with lower prices for tropical product exports result in adverse terms-of-trade losses in these countries. The largest terms-of-trade loss are estimated for Egypt, at US$35.88 million. More than 90 percent of this income loss is due to higher costs of grains imports, estimated at US$32 million.

Indonesia, Pakistan, Yemen, Sri Lanka, Nigeria, Honduras and Ghana will face terms-of-trade losses at more than US$5 million. The largest estimated terms-of-trade losses are as follows: Yemen (8.05), Nigeria (6.16), Ghana (5.13), Ethiopia (4.71), Sudan (4.39), Kenya (3.75), Zaire (2.1), Mali (1.93), and Mozambique (1.35). The smallest terms-of-trade loss, at less than 0.5 million, are estimated for Rwanda, Madagascar, Gambia, Central African Republic, Burkina Faso and Comoros.

In South Asia, four countries are least-developed, but the region is largely self-sufficient in basic cereals, although a net-importer of wheat. It is also a net importer of oilseeds and dairy products, but a major exporter of tea, cotton, jute, and tobacco. On balance, small losses in terms-of-trade are shown in several countries. The least-developed countries in Southeast and East Asia have a similar pattern of trade balance as in South Asia; with terms-of-trade losses from higher prices of wheat and coarse grains more than offset by gains due to potential increases in rice prices, its major export product.

In contrast, terms-of-trade gains are predicted in several African countries including Guyana, Nicaragua, Sierra Leone, Liberia, Lesotho, Botswana and Maldives. Countries which are net exporters of beverages (coffee, cocoa, tea) are adversely affected given the predicted decline in world prices in these commodities. Egypt, a rice net exporter, will be adversely affected by the predicted decline in the price of rice.

Table 6. Impact of the Uruguay Round on Terms-of-Trade in Agriculture of Least-Developed Countries

Countries	Terms of Trade Scenario II 1/ mil US $	Terms of Trade Scenario IV 2/ mil US $	Percent of GDP Scenario II 1/ Percent	Percent of GDP Scenario IV 2/ Percent
Bangladesh	1.47	-19.88	-0.02	-0.05
Benin	-1.94	-2.22	-0.10	-0.11
Bhutan	-0.08	-0.49	-0.03	-0.19
Botswana	0.10	1.35	0.00	0.04
Burkina Faso	-1.82	-0.11	-0.07	0.00
Burundi	0.06	1.79	0.01	0.16
Cambodia	0.19	-0.30	0.02	-0.03
Central African Republic	-0.48	-0.54	-0.04	-0.04
Chad	-1.96	1.09	-0.15	0.09
China	-46.89	78.24	-0.01	0.02
Comoros	-0.16	-0.73	-0.06	-0.29
Egypt	-39.09	-113.10	-0.11	-0.33
Equatorial Guinea	-0.08	-0.36	-0.06	-0.25
Ethiopia	-3.22	-3.08	-0.05	-0.05
Gambia	-0.51	-4.01	-0.15	-1.19
Ghana	-5.05	-7.01	-0.08	-0.10
Guinea	-0.99	-11.12	-0.03	-0.37
Guinea-Bissau	0.01	-0.80	0.01	-0.35
Guyana	2.12	12.63	0.78	4.66
Haiti	-1.13	-8.03	-0.06	-0.45
Honduras	-4.51	11.01	-0.15	0.36
India	8.90	78.44	0.00	0.03
Indonesia	10.80	12.45	0.01	0.01
Kenya	0.73	11.69	0.01	0.14
Lao PDR	-0.31	-0.44	-0.03	-0.04
Lesotho	0.15	-3.93	0.02	-0.62
Liberia	0.67	-1.83	0.06	-0.16
Madagascar	0.22	3.16	0.01	0.11
Malawi	2.46	12.35	0.13	0.63
Maldives	0.45	-0.70	0.27	-0.42
Mali	-4.37	-0.38	-0.17	-0.01
Mauritania	-1.10	-5.74	-0.10	-0.52
Mozambique	-1.20	-5.44	-0.09	-0.39
Myanmar	-0.20	3.33	0.00	0.01
Namibia	-1.18	-0.81	-0.05	-0.04
Nepal	-0.13	-1.41	0.00	-0.04
Nicaragua	0.56	6.84	0.03	0.40
Niger	-1.41	-3.81	-0.06	-0.16
Nigeria	-5.88	-29.42	-0.02	-0.09
Pakistan	-16.61	-19.16	-0.04	-0.04
Rwanda	0.30	1.35	0.02	0.07
Sao Tome & Principe	-0.07	-0.22	-0.16	-0.46
Sierra Leone	0.56	-2.89	0.07	-0.38
Solomon Islands	0.25	0.03	0.11	0.01
Somalia	-0.92	-3.16	-0.10	-0.34
Sri Lanka	-1.70	-4.69	-0.02	-0.05
Sudan	-5.78	0.92	-0.08	0.01
Tanzania	-0.87	4.29	-0.03	0.15
Togo	-1.66	-1.14	-0.10	-0.07
Uganda	-0.01	4.38	0.00	0.15
Viet Nam	-1.05	15.88	-0.01	0.18
Yemen	-8.34	-36.84	-0.10	-0.43
Zaire	-1.61	-5.05	-0.02	-0.06
Zambia	-0.91	-0.57	-0.03	-0.02
Zimbabwe	1.87	15.55	0.06	0.47

1/Based on price changes in Scenario II by Goldin, et al. (1995).

2/Based on price changes in scenario IV by Goldin, et al. (1995).

Source of basic data: FAO Commodity Balance Database.

For a number of reasons, the estimated first-order terms-of-trade losses may decline if the effects of distortions are considered. First, if governments allow transmission of the changes in world prices to domestic prices, local output may rise and some decline in net-food imports will occur. Second, in many least-developed countries, food imports partly occurs due to inappropriate policies such as taxes on output and subsidies on food consumption and imports. In these situations, if higher world food prices are transmitted to domestic prices, they will reduce the burden of these distortions. In these cases, governments may find it more cost-effective to target assistance to the poor and not to distort domestic prices for all segments of the population.

Consistent with the results of Tyers and Falvey (1989) and Anderson (1994, 1996), these distortion effects may even be large enough to offset the adverse terms-of-trade losses. Increased production will raise tax revenue, while lower imports will reduce subsidy costs. More importantly, if governments in these countries reform inappropriate policies, endogenous productivity may result from higher profitability and other dynamic gains from liberalization. If this occurs and supply response expands, some least-developed net-food importers could become net-exporters and thus benefit directly from higher world prices.

Overall, the results indicates the importance of more comprehensive welfare measures based on general equilibrium analysis incorporating the effects of both trade and domestic policy distortions in evaluating the impacts of world agricultural price shocks as a result of trade liberalization. The results for individual countries, while not very sensitive to the elasticity measures, are sensitive to the sign and magnitude of domestic and trade distortions. Because of data constraints, the more comprehensive welfare measures are only estimated for a few countries. Future efforts to develop quality databases about trade and domestic policy distortions in developing countries will be important to adequately assess the welfare effects of future multilateral reforms.

IV. CONCLUSIONS AND POLICY IMPLICATIONS

The welfare effects of the agricultural price shocks resulting from the Uruguay Round for least-developed and net-food importing countries are evaluated in this paper. The analysis provide further evidence that the nature of welfare changes are significantly affected by the structure of trade and domestic distortions present in the economy. The first-order terms-of-trade changes indicate that while many countries are adversely affected due to increases in world prices, the net increase are small relative to total GDP. It is likely that even the small terms-of-trade losses will

have negative impact on some segments of the population in least-developed countries. In food-deficit countries where there are certain vulnerable population groups, the potential adverse effects should not be ignored. However, the negative impacts can be partly outweighed by domestic policy reforms designed to improve agricultural efficiency and productivity and by other areas of reform in other sectors under the Round.

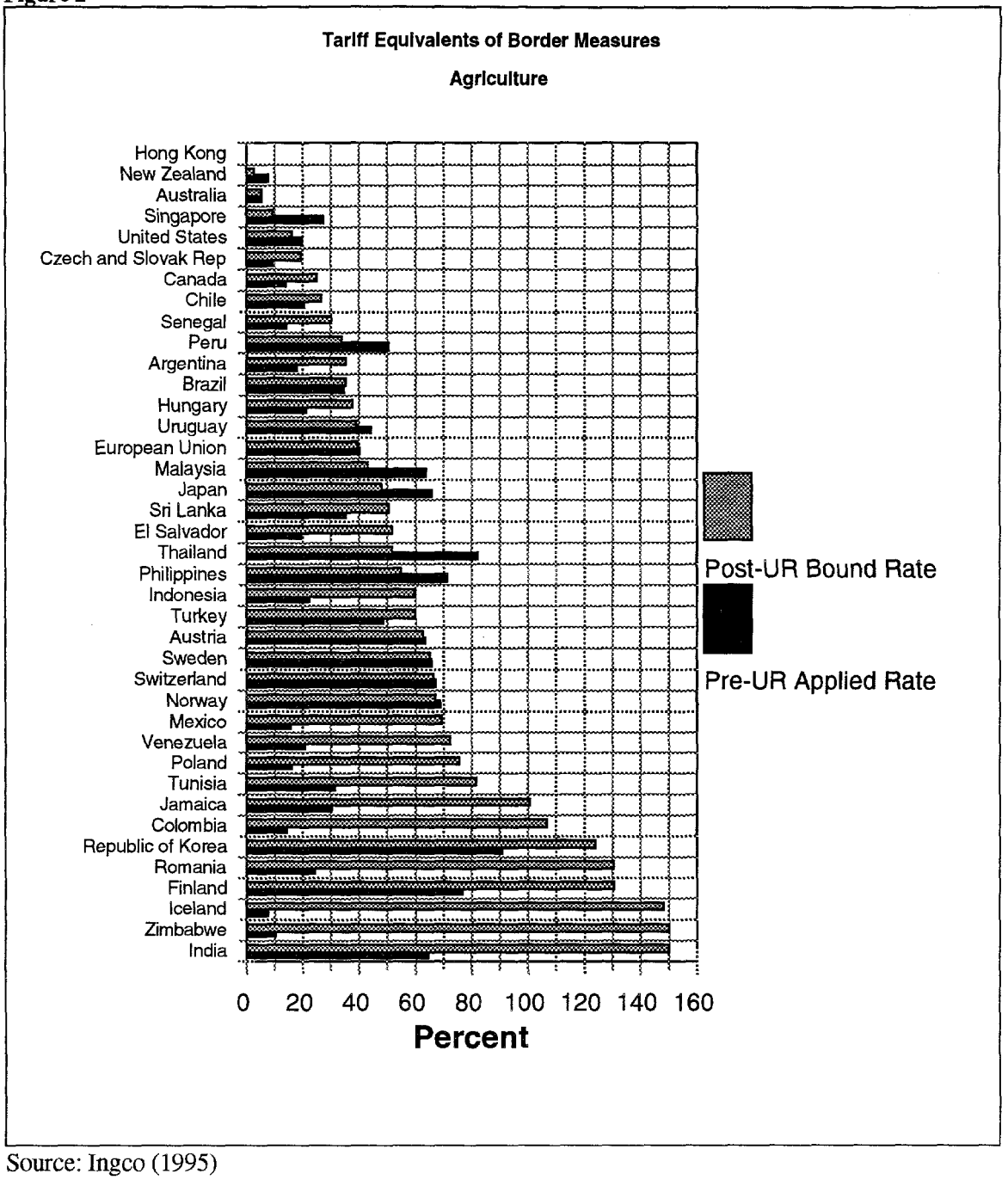
The results demonstrate the potential benefits of removing the trade and domestic distortions to offset the terms-of-trade losses resulting from agricultural trade liberalization. Many of the least-developed and low-income food-deficit countries tax their agricultural sector either implicitly by giving higher protection to industry, or more explicitly by taxing exports of many commodities or by maintaining government controlled domestic prices below world prices. In the longer-run, the agreed UR reforms and any further unilateral reduction of agricultural support and protection in the industrial countries could have a dynamic impact on the development of agricultural production and could provide these countries with an opportunity to expand foreign exchange earnings from their agricultural exports. Higher prices would improve the profitability of the farming sector in some countries and reduce government expenditures on agricultural income support programs in others. More remunerative prices in the long-run could contribute to making food production in food- deficit countries more attractive.

Although not all, many least-developed countries did not use the UR to support domestic efforts at trade an domestic policy reform. As shown in many studies, most of the gains from UR come from countries' own liberalization efforts. Thus, by making zero or very limited liberalization commitments, countries have lost one opportunity for efficiency gains. Given the limited outcome of the UR agreement in own liberalization of least- developed countries, the extent of structural reform and trade liberalization in these countries will depend on unilateral initiatives taken independently or in the context of World Bank or IMF programs. Unless further liberalization and structural reforms are pursued, the ability of these countries to take advantage of the arising market opportunities in their more open export markets may also be lost.

The World Bank is attentive to the problems of Least-Developed and Net Food-Importers, monitoring their situation both in the context of world food markets and through its regular country dialogue, technical assistance and lending programs. In general, the priority that a country receives for World Bank lending is determined by its overall need and the contribution that the Bank can make to its long-term development. The World Bank Group is working to raise agricultural

productivity in least-developed net-food importing countries by encouraging rural development through a wide variety of measures and programs. Bank lending and technical assistance programs for rural development in these countries include (1) encouraging appropriate policies and strategies; (2) enhancing food supplies through intensification of production systems and through sound natural resource management; (3) improving access to food; and (4) improving utilization of food. Key elements of the strategy include supporting government policies and strategies that encourage investment and growth, and which do not discriminate against agriculture and small farmers; promoting better technology and production techniques; investing in infrastructure and people, and promoting appropriate macroeconomic policies and institutions. In FY96, Bank lending for agriculture and rural development was one of the largest single lending sectors, with commitments totaling $2,576.7 million (in 1992 prices). Nearly one-third of the total was given to low-income countries. During 1991-95, the countries of Sub-Saharan Africa received about 40 percent of the Bank Group's total agricultural sector adjustment lending.

Figure 2



Source: Ingco (1995)

Table 1. Average Import Price Reductions, percent. 1/

COUNTRY/REGION	WHEAT	RICE	COARSE GRAINS	SUGAR	MEAT	OILSEEDS	DAIRY
EUROPEAN UNION	-	-	-	-	-12	-	-
UNITED STATES	-15	-	-	-	-	-	-
JAPAN	-81		-91	-47	-33	-	-14
AUSTRALIA	-	-4	-	-	-	-1	-19
CANADA	-	-	-	-	-	-	-
EFTA	-	-	0	-14	-	-18	-
UPPER INCOME ASIA	-106	-	-76	-7	-44	-5	-
INDONESIA	-	-	-	-	-	-33	-
INDIA	-	-	-	-	-	-3	-
LOW-INCOME ASIA	-	-	-	-	-	-	-
BRAZIL	-31	-	-	-	-	-	-
MEXICO	-	-	-	-	-	-1	-
OTHER LATIN AMERICA	-	-	-	-	-	-	-
NIGERIA	-12	-	-16	-	-	-	-
MEDITERRANEAN	-	-	-	-	-	-	-
OTHER AFRICA	-	-	-	-	-	-	-
SOUTH AFRICA	-	-	-	-	-	-	-
MAGHREB	-	-	-	-	-	-	-

1/ Calculated as change in tariff rate divided by the power of the initial tariff rate. Where the post-UR rate is greater than the counterfactual rate, a zero price reduction is assumed, indicated by (-).

2/ Japan delayed tariffication in rice.

Source: Ingco, 1995.

Table 2. Impact of Uruguay Round liberalization on world agricultural prices (percentage change from benchmark levels at the end of implementation period).

Commodities	Brandao & Martin (1993) Dunkel scenario	Goldin, et.al. (1993)	Goldin, et.al. (1995) Scenario I 79-93 base	Goldin, et.al. (1995) Scenario II 89-93 base	Goldin, et.al (1995) Scenario IV (with no slippage)	FAO 1995
Wheat	6.18	5.9	1.2	3.8	10.3	7.0
Rice	4.02	-1.9	-1.5	-0.9	3.6	7.0
Coarse grains	3.30	3.6	0.1	2.3	5.4	4.0
Sugar	9.92	10.2	-1.0	1.8	11.4	na
Beef & veal	7.16	4.7	0.2	0.6	6.0	8.0
Other meats	4.02	1.0	-0.9	-0.6	2.3	na
Coffee	1.35	-6.1	-1.7	-1.5	-0.7	na
Cocoa	0.90	-4.0	-1.3	-0.7	0.3	na
Tea	2.66	3.0	-1.6	-1.4	0.9	na
Vegetable Oils	3.77	4.1	-0.6	-0.3	5.4	4.0
Dairy	12.18	7.2	-1.3	1.2	12.1	7.0
Other Foods	1.33	-1.7	-1.3	-1.4	-0.7	na
Cotton	1.82	3.7	-1.1	-1.2	1.2	na
Other Agriculture	2.62	5.9	-0.5	0.8	2.9	na

Sources: Brandao and Martin, 1993; Goldin and van der Mensbrugghe, 1995; FAO, 1995; Martin and Winters, 1995.

Table 3. Net Trade Balance (Imports-Exports), Average 1990-93, Million US$

Country	Categogy	Total Food *	Cereals, Lvst Pulses **	Cereals ***	Country	Categogy	Total Food *	Cereals, Lvst Pulses **	Cereals ***
Saudi Arabia		3421	2484	717	Mali	lifd	18	-18	31
Rep. of Korea		2226	1945	1348	Guinea-Bissau	lifd	17	11	17
Algeria		2211	1464	728	Suriname		16	-10	-15
Egypt	lifd	2209	1294	1019	Cambodia	lifd	15	13	12
Portugal		1991	990	407	Grenada		15	12	3
Iran Islamic Rep		1843	1005	915	Samoa	lifd	15	8	3
United Arab Emirates		1075	784	88	Central African Rep	lifd	12	8	7
Mexico		1500	848	913	Senegal	lifd	7	249	141
Spain		1339	-1951	290	Papua New Guinea	lifd	4	150	62
Libya		1257	675	403	Sao Tome & Principe	lifd	3	4	3
Iraq		1146	727	452	Malawi	lifd	1	67	55
Yugoslavia		767	308	-1	Mongolia	lifd	-5	-28	11
Romania		731	314	192	Laos	lifd	-10	-5	8
Venezuela		713	441	232	Chad	lifd	-11	-19	11
Yemen	lifd	704	485	305	Maldives	lifd	-12	15	5
Nigeria	lifd	686	414	185	Dominica	lifd	-13	111	99
Greece		670	291	-159	Saint Lucia		-14	-28	6
Lebanon		595	349	83	Zimbabwe	lifd	-21	22	50
Kuwait		569	421	53	Rwanda	lifd	-31	24	7
Pakistan	lifd	569	13	-39	Nicaragua	lifd	-33	20	42
Jordan	lifd	554	355	221	Namibia		-32	-47	14
Angola	lifd	520	237	63	Bolivia	lifd	-33	33	53
Bangladesh	lifd	354	346	202	Belize		-46	-10	4
Israel		266	-150	277	Sri Lanka	lifd	-46	219	166
Syria	lifd	266	-26	0	Burundi	lifd	-47	17	6
Mozambique	lifd	192	140	124	Saint Vincent		-49	-38	-4
Haiti	lifd	189	126	91	Mauritania	lifd	-54	42	51
Morocco	lifd	175	-106	275	Tanzania	lifd	-67	15	33
Malta		169	114	21	Peru	lifd	-78	387	341
Botswana		169	65	36	El Salvador	lifd	-98	98	47
Bahamas		151	134	10	Fiji		-109	55	-23
Brunei Darusalam		150	96	16	Uganda	lifd	-113	1	-1
Trinidad & Tobago		132	137	45	Myanmar		-117	-123	-47
Albania		131	95	58	Guyana		-119	-1	-14
Gabon		130	96	23	Cameroon	lifd	-121	73	52
Lesotho	lifd	129	87	19	Swaziland		-128	13	14
Zaire	lifd	128	163	73	Madagascar	lifd	-132	17	29
Guinea	lifd	118	150	63	Ghana	lifd	-153	125	76
Congo	lifd	107	79	25	Panama		-175	-125	26
Bthiopia	lifd	84	166	148	Mauritius		-188	132	40
Burkina Faso	lifd	83	66	46	Paraguay		-237	-79	-13
Sierra Leone	lifd	79	77	47	Bulgaria		-262	-328	-14
Afghanistan	lifd	79	-1	61	South Africa		-357	-314	182
Benin	lifd	76	65	40	Kenya		-391	-29	65
Liberia	lifd	76	62	47	Philippines	lifd	-451	263	316
Sudan	lifd	65	91	129	Poland		-493	-634	58
Gambia	lifd	63	35	21	Honduras	lifd	-503	-336	30
Barbados		62	60	14	Guatemala	lifd	-509	-62	62
Cyprus		61	-14	62	Uruguay		-545	-487	-104
Zambia	lifd	54	50	49	Costa Rica		-750	-483	53
Niger	lifd	53	18	34	Viet Nam		-763	-345	-269
Djibouti	lifd	51	30	12	Cote d'Ivoire	lifd	-928	187	137
Tunisia		48	143	148	Ecuador	lifd	-1241	-547	77
Togo	lifd	43	37	15	Malaysia		-1543	705	486
Cape Verde	lifd	43	23	11	Indonesia	lifd	-1685	316	442
Dominican Rep	lifd	40	111	99	Colombia		-1775	-269	149
Czechoslovakia		40	-265	10	Chile		-1878	-895	75
Jamaica		37	83	69	India	lifd	-2123	-369	-230
Antigua and Barbuda		35	21	2	China		-4175	-1837	1746
Somalia	lifd	28	17	61	Brazil		-5470	-613	854
Nepal	lifd	24	-1	4	Thailand		-5474	-2763	-1251
Seychelles		22	21	5	Argentina		-6565	-3107	-1352
Solomon Islands		19	13	8					

Source: FAO Commodity Balances Database

* Total food include all edible commodities

** Includes cereals, pulses, roots and tubers, and livestock products and fruits and vegetables

*** Includes wheat and wheat flours in wheat equivalent, coarse grains and rice

Table 4a. Average Applied Rates of Border Protection and UR Tariff Bindings in Sub-Saharan Africa.

Food Commodity	Applied Protection, %	UR Tariff Binding, % *
Wheat	-1	135
Rice	2	166
Coarse Grains	-15	133
Sugar	16	100
Oilseeds	-19	162

*Excludes additional charges

Source: See Ingco (1995) for more details.

Table 4b. Tariff Ceiling Bindings and Other Duties in Agricultural Products in selected Least-Developed Countries

Countries	Tariff Ceiling Bindings, %	Other Duties & Charges, %
Bahrain	35	2
Cameroon	80	230
Cote d'Ivoire	4, 64	200
Gabon	60	200
Ghana	40, 99	15
Kenya	62, 100	0
Madagascar	30	250
Mauritius	37, 82, 122	17
Nigeria	150	80
Senegal	30	150
Zimbabwe	25, 150	15
Antigua & Barbuda	100, 130	
Belize	100, 110,	
Brunei Darusalam	20, 50	
Dominica	100	
Guyana	100	40
Jamaica	100	80, 200
St. Lucia	100, 130	
St. Vincent	100, 130	
Trinidad & Tobago	100, 106, 110, 126, 156	15
Swaziland	0-597	

Source: WTO Country Schedule of URA Tariff Commitments

Table 6a. Impact of the Uruguay Round on Food Terms of Trade of Least-Developed Countries

Countries	Commodity	Terms of Trade Effects: Scenario II 1/ mil US $ (4)	Terms of Trade Effects: Scenario IV 2/ mil US $ (5)	Percent of GDP: Scenario II 1/ Percent (6)	Percent of GDP: Scenario IV 2/ Percent (7)
Bangladesh	Total Food	-1.75	-24.14	-0.01	-0.10
Benin	Total Food	-0.53	-3.60	-0.03	-0.18
Bhutan	Total Food	-0.07	-0.48	-0.03	-0.18
Botswana	Total Food	0.30	1.42	0.01	0.04
Burkina Faso	Total Food	-0.21	-3.13	-0.01	-0.11
Burundi	Total Food	-0.59	-0.51	-0.05	-0.04
Cambodia	Total Food	0.07	-0.75	0.01	-0.07
Central African Republic	Total Food	-0.33	-1.12	-0.03	-0.09
Chad	Total Food	-0.83	-0.79	-0.07	-0.06
China	Total Food	-71.77	14.60	-0.01	0.00
Comoros	Total Food	-0.16	-0.84	-0.06	-0.34
Egypt	Total Food	-35.88	-111.49	-0.10	-0.32
Equatorial Guinea	Total Food	-0.05	-0.40	-0.04	-0.29
Ethiopia	Total Food	-4.71	-8.22	-0.07	-0.13
Gambia	Total Food	-0.34	-3.77	-0.10	-1.12
Ghana	Total Food	-5.13	-7.20	-0.08	-0.11
Guinea	Total Food	0.05	-5.08	0.00	-0.17
Guinea-Bissau	Total Food	0.04	-0.82	0.02	-0.36
Guyana	Total Food	1.98	12.04	0.73	4.44
Haiti	Total Food	-1.30	-9.60	-0.07	-0.53
Honduras	Total Food	-5.92	5.79	-0.19	0.19
India	Total Food	-1.83	20.63	0.00	0.01
Indonesia	Total Food	-17.94	-45.00	-0.02	-0.04
Kenya	Total Food	-3.75	-3.09	-0.05	-0.04
Kenya	Total Food	-0.42	-1.11	-0.04	-0.11
Lesotho	Total Food	0.32	-3.62	0.05	-0.57
Liberia	Total Food	0.44	-2.68	0.04	-0.24
Madagascar	Total Food	-0.37	0.77	-0.01	0.03
Malawi	Total Food	-0.50	1.87	-0.03	0.09
Maldives	Total Food	0.25	-1.52	0.15	-0.91
Mali	Total Food	-1.93	-4.97	-0.08	-0.20
Mauritania	Total Food	-1.39	-7.76	-0.12	-0.70
Mozambique	Total Food	-1.35	-7.02	-0.10	-0.51
Myanmar	Total Food	-0.57	1.51	0.00	0.00
Namibia	Total Food	-1.15	-0.58	-0.05	-0.03
Nepal	Total Food	-0.06	-1.43	0.00	-0.05
Nicaragua	Total Food	0.52	3.49	0.03	0.20
Niger	Total Food	-1.22	-3.69	-0.05	-0.15
Nigeria	Total Food	-6.16	-30.98	-0.02	-0.09
Pakistan	Total Food	-8.58	-25.15	-0.02	-0.06
Rwanda	Total Food	-0.37	-1.11	-0.02	-0.06
Sao Tome & Principe	Total Food	-0.06	-0.19	-0.12	-0.40
Sierra Leone	Total Food	0.46	-3.42	0.06	-0.44
Solomon Islands	Total Food	0.11	-0.44	0.05	-0.20
Somalia	Total Food	-0.99	-3.55	-0.11	-0.39
Sri Lanka	Total Food	-6.25	-21.65	-0.07	-0.24
Sudan	Total Food	-4.39	-5.62	-0.06	-0.08
Tanzania	Total Food	-0.85	-1.42	-0.03	-0.05
Togo	Total Food	-0.60	-2.26	-0.04	-0.14
Uganda	Total Food	-1.01	0.30	-0.03	0.01
Viet Nam	Total Food	-4.53	10.41	-0.05	0.12
Yemen	Total Food	-8.05	-40.24	-0.09	-0.47
Zaire	Total Food	-2.10	-6.74	-0.02	-0.08
Zambia	Total Food	-0.86	-0.70	-0.03	-0.02
Zimbabwe	Total Food	-1.10	1.55	-0.03	0.05

1/Based on price changes in Scenario II by Goldin, et al. (1995).

Table 6b. Impact of the Uruguay Round on Terms-of-Trade in Agriculture of Least-Developed Countries

Countries	Terms of Trade Scenario II 1/ mil US $	Terms of Trade Scenario IV 2/ mil US $	Percent of GDP Scenario II 1/ Percent	Percent of GDP Scenario IV 2/ Percent
Bangladesh	1.47	-19.88	-0.02	-0.05
Benin	-1.94	-2.22	-0.10	-0.11
Bhutan	-0.08	-0.49	-0.03	-0.19
Botswana	0.10	1.35	0.00	0.04
Burkina Faso	-1.82	-0.11	-0.07	0.00
Burundi	0.06	1.79	0.01	0.16
Cambodia	0.19	-0.30	0.02	-0.03
Central A "ican Republic	-0.48	-0.54	-0.04	-0.04
Chad	-1.96	1.09	-0.15	0.09
China	-46.89	78.24	-0.01	0.02
Comoros	-0.16	-0.73	-0.06	-0.29
Egypt	-39.09	-113.10	-0.11	-0.33
Equatorial Guinea	-0.08	-0.36	-0.06	-0.25
Ethiopia	-3.22	-3.08	-0.05	-0.05
Gambia	-0.51	-4.01	-0.15	-1.19
Ghana	-5.05	-7.01	-0.08	-0.10
Guinea	-0.99	-11.12	-0.03	-0.37
Guinea-Bissau	0.01	-0.80	0.01	-0.35
Guyana	2.12	12.63	0.78	4.66
Haiti	-1.13	-8.03	-0.06	-0.45
Honduras	-4.51	11.01	-0.15	0.36
India	8.90	78.44	0.00	0.03
Indonesia	10.80	12.45	0.01	0.01
Kenya	0.73	11.69	0.01	0.14
Lao PDR	-0.31	-0.44	-0.03	-0.04
Lesotho	0.15	-3.93	0.02	-0.62
Liberia	0.67	-1.83	0.06	-0.16
Madagascar	0.22	3.16	0.01	0.11
Malawi	2.46	12.35	0.13	0.63
Maldives	0.45	-0.70	0.27	-0.42
Mali	-4.37	-0.38	-0.17	-0.01
Mauritania	-1.10	-5.74	-0.10	-0.52
Mozambique	-1.20	-5.44	-0.09	-0.39
Myanmar	-0.20	3.33	0.00	0.01
Namibia	-1.18	-0.81	-0.05	-0.04
Nepal	-0.13	-1.41	0.00	-0.04
Nicaragua	0.56	6.84	0.03	0.40
Niger	-1.41	-3.81	-0.06	-0.16
Nigeria	-5.88	-29.42	-0.02	-0.09
Pakistan	-16.61	-19.16	-0.04	-0.04
Rwanda	0.30	1.35	0.02	0.07
Sao Tome & Principe	-0.07	-0.22	-0.16	-0.46
Sierra Leone	0.56	-2.89	0.07	-0.38
Solomon Islands	0.25	0.03	0.11	0.01
Somalia	-0.92	-3.16	-0.10	-0.34
Sri Lanka	-1.70	-4.69	-0.02	-0.05
Sudan	-5.78	0.92	-0.08	0.01
Tanzania	-0.87	4.29	-0.03	0.15
Togo	-1.66	-1.14	-0.10	-0.07
Uganda	-0.01	4.38	0.00	0.15
Viet Nam	-1.05	15.88	-0.01	0.18
Yemen	-8.34	-36.84	-0.10	-0.43
Zaire	-1.61	-5.05	-0.02	-0.06
Zambia	-0.91	-0.57	-0.03	-0.02
Zimbabwe	1.87	15.55	0.06	0.47

1/Based on price changes in Scenario II by Goldin, et al. (1995).

2/Based on price changes in scenario IV by Goldin, et al. (1995).

Source of basic data: FAO Commodity Balance Database.

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